

REMARKS

Pursuant to the present amendment, claims 32-38 have been added. Thus, claims 10-38 are pending in the present application. No new matter has been introduced by way of the present amendment. Support for the newly added claims may be found in the specification at, for example, p. 13, l. 17 – p. 14, l. 14. Reconsideration of the present application is respectfully requested in view of the amendments and arguments set forth herein.

In the Office Action, claims 10-31 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Rajagopalan (U.S. Patent No. 6,656,840). Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirk v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. "Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a

given set of circumstances is not sufficient.” *Skinner*, at 1789, citing *Oelrich*. Where anticipation is found through inherency, the Office’s burden of establishing *prima facie* anticipation includes the burden of providing “...some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art.” *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or

modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

All of the pending claims require the formation of a first silicon nitride layer on an exposed copper surface, and the formation of a second silicon nitride layer on the first silicon nitride layer. All pending claims also require that the concentration of silicon in the second nitride layer is greater than the concentration of silicon in the first silicon nitride layer. Of course, the pending claims may contain additional limitations as well. It is respectfully submitted that Rajagopalan does not disclose or suggest the methods set forth in the pending claims.

Rajagopalan is understood to be directed to a process of forming first and second layers of silicon and an element (nitrogen or carbon), wherein the atomic ratio of the element (e) to silicon (e/Si) is greater in the first layer than in the second layer. Col. 2, ll. 25-35. Rajagopalan discloses that the gas flow rates of one or both of the process gases may be adjusted to achieve the desired atomic ratios in the first and second layers. Col. 4, ll. 44-49; Col. 11, ll. 34-36. In a particular example described therein, Rajagopalan discloses that the flow rate of silane may be increased during the formation of the second layer to achieve the desired atomic ratio. Col. 5, l.

54 – Col. 6, l. 5. Even more specifically, Rajagopalan discloses that the first layer may be formed with a silane flow rate of about 27 sccm, whereas the second layer may be formed with a silane flow rate of about 110 sccm while the nitrogen flow rate may be maintained at about 5000 sccm in forming both the first and second layers.

From the foregoing, it is clear that Rajagopalan does not anticipate nor render obvious the pending claims for many reasons. Rajagopalan is simply not concerned with the absolute amounts of silicon in the first and second layers – Rajagopalan is only concerned with the relative atomic ratios of the element to silicon in each of the layers. As understood by the undersigned, Rajagopalan does not express any desired preference or method for reaching the desired atomic ratios. For example, the silane flow rate may be held constant in forming the first and second layers while decreasing the flow rate of nitrogen in forming the second layer. Thus, it is clear that the relative absolute amounts of silicon in the first and second layers is of no consequent Rajagopalan - as long as the desired atomic ratios are maintained. For at least these reasons, it is respectfully submitted that claims 10-31 are allowable over the prior art of record.

Moreover, there is no suggestion to modify the teachings of Rajagopalan so as to arrive at Applicants' invention. As set forth above, Rajagopalan is only concerned with atomic ratios, not absolute levels of silicon, in each of the first and second layers. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to

assert that the inventions defined by the claims are obvious in view of the prior art of record constitutes an impermissible use of hindsight using Applicants' disclosure as a roadmap.

New dependent claims 32-34 have been added to further define Applicants' invention. Each of these dependent claims recite precise process conditions for the formation of the first and second layers of silicon nitride. Such precise parameters are not disclosed nor obvious in view of the art of record. As understood by the undersigned, the deposition parameters identified in Rajagopalan do not fall within the ranges set forth in new dependent claims 32-34. Moreover, as discussed above, the overall disclosure of Rajagopalan does not specify that the parameters set forth in claims 32-34 may be employed in forming the first and second layers disclosed therein. Presumably, Rajagopalan discloses using relatively low flow rates of silane to achieve the purposes of the methods disclosed therein. It is believed that dependent claims 32-34 are allowable over the prior art of record for at least this reason.

New claims 35-38 have been added to further define Applicants' invention. New independent claim 35 recites the precise process conditions involved in the formation of the first and second layers of silicon nitride. It is believed that new claims 35-38 are allowable for many of the same reasons set forth above with respect to new dependent claims 32-34. New independent claim 35 also requires that the first and second layers are formed without interrupting a vacuum. Thus, it is believed that new claims 35-38 are likewise in condition for allowance.

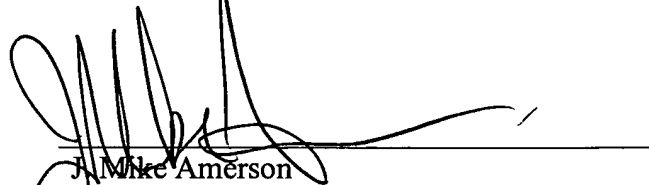
For at least the aforementioned reasons, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the under-

signed attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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